# Soil and Land Management

**Soil and landscape management addresses the concerns dealing with soil conservation and appropriate use. As the urban expansion consumes tillable acres, the need for improved soil management becomes critical. The standards of this course prepare students to demonstrate practices for wise land use in the 21st century.**

| | |
|---|---|
| **Pre-requisite:** | **Any fundamental course in the Natural Resources Sub-cluster** |
| **Recommended Credit:** | **½ or 1** |
| **Recommended Grade Level:** | **10th, 11th, or 12th** |

***** **½ denotes learning expectations that must be met when teaching the course for ½ credit.**

****** **All other learning expectations must be met when teaching the course for 1 credit.**

# Soil and Land Management

**Standard 1.0**

The student will evaluate conservation measures necessary for the use of natural resources for future generations.

**Standard 2.0**

The student will evaluate management practices needed to ensure a plentiful supply of quality water.

**Standard 3.0**

The student will analyze the physical properties of soil and their relationship to plant growth.

**Standard 4.0**

The student will summarize the fundamentals of soil use and land management.

**Standard 5.0**

The student will analyze the chemical elements essential to plant growth and the importance and benefits of fertilizers.

**Standard 6.0**

The student will evaluate the nutrient requirements of plants and nutrient deficiencies in plants.

**Standard 7.0**

The student will evaluate the types of pollution in the environment and methods of controlling pollution.

**Standard 8.0**

The student will analyze factors used for selecting a site that ensures the optimum growth and economic return of agricultural crops.

**Standard 9.0**

The student will integrate academic competencies in the area of soil and landscape management.

**Standard 10.0**

The student will develop premier leadership and personal growth needed for careers in the area of crop production.

# Soil and Land Management

Course Description:
Soil and landscape management addresses the concerns dealing with soil conservation and its appropriate use. As the urban expansion consumes tillable acres, the need for improved soil management becomes critical. The standards of this course prepare students to demonstrate practices for wise land use in the 21st century.

## Standard 1.0

**The student will evaluate conservation measures necessary for the use of natural resources for future generations.**

Learning Expectations:
The student will:

| | | |
|---|---|---|
| 1.1 | Summarize terms related to natural resources and the environment. | ½ |
| 1.2 | Evaluate the economic impact of natural resources in agriculture. | ½ |
| 1.3 | Classify the major categories of natural resources. | ½ |
| 1.4 | Evaluate ways population growth and societal change affect natural resources. | ½ |
| 1.5 | Evaluate the role of individuals and organizations that work with conservation and the environment. | ½ |

Evidence Standard is Met:
The student will:

- Determine how natural resources and the environment are related.
- Compare renewable and nonrenewable resources.
- Summarize the major categories of natural resources.
- Complete research on and share the effects of population growth on natural resources.
- Recommend individuals and organizations that work with conservation and the environment.

Integration/Linkages
Biology, Ecology, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills), National FFA CDE, career development event, Guidelines for Soil Judging

Sample Performance Tasks

- Interview or research on the Internet organizations and individuals that work with conservation and debate the impact they have on environmental issues.
- Chart the population growth over a period of time and the effects it has on natural resources.
- Create a portfolio that describes the uses for renewable and nonrenewable resources.

## Standard 2.0

**The student will evaluate management practices needed to ensure a plentiful supply of quality water.**

Learning Expectations:
The student will:

| | | |
|---|---|---|
| 2.1 | Evaluate the management of surface water and the impact of water runoff on land use. | ½ |
| 2.2 | Determine the effects of groundwater on agricultural use. | |
| 2.3 | Evaluate the types of agricultural wastes and techniques for reclamation. | |

Evidence Standard is Met:
The student will:

- Compare strip cropping, contour farming, terracing and no-till farming and assess the impact of water runoff.
- Determine the effects of large-scale irrigation on the water table.
- Assess the impact of the improper handling and application of chemicals on the pollution of groundwater.
- Calculate the impact of nitrogen levels from livestock wastes on groundwater pollution.

Integration/Linkages
Biology, Chemistry, Language Arts, National FFA CDE Guidelines for Soil Judging, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- Research ways pollutants enter the groundwater, and present methods for reducing groundwater pollution.
- Determine land in the local area that should be targeted for control of runoff.
- Specify management practices that control water runoff.
- Recommend methods of reducing water pollution.
- Using water samples from ponds, lakes or rivers, construct tests to determine chemical contamination levels.

## Standard 3.0

**The student will analyze the physical properties of soil and their relationship to plant growth.**

Learning Expectations:

The student will:

| | | |
|---|---|---|
| 3.1 | Compare soil particles, texture, drainage class, and rooting depth of a soil profile. | ½ |
| 3.2 | Determine land class based on soil characteristics. | ½ |
| 3.3 | Examine the effect of different slopes on soil erosion. | ½ |
| 3.4 | Evaluate the importance of organic matter in the soil. | ½ |
| 3.5 | Analyze soil formation and the development of the horizons in soil. | ½ |

Evidence Standard is Met:

The student will:

- Summarize physical characteristics of soil in a soil profile.
- Determine the land class of a certain soil profile using soil characteristics.
- Calculate slope and its impact on soil erosion.
- Appraise the importance of organic matter in the soil.
- Determine the process by which soil is formed and developed.

Integration/Linkages

Biology, Chemistry, Geology, Geography, Language Arts, Mathematics, National FFA CDE Guidelines for Soil Judging, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- Evaluate soil using the Tennessee Soil Judging Card.
- Measure examples of soil erosion in the field.
- Classify soil horizons by their characteristics.
- Determine the slope of land by using a farm transit and level.
- Use a soil test to determine nutritional needs of the soil.

## Standard 4.0

**The student will summarize the fundamentals of soil use and land management.**

Learning Expectations:

The student will:

| | |
|---|---|
| 4.1 | Evaluate soil and water conservation needs. |
| 4.2 | Recommend soil management practices. |
| 4.3 | Summarize physical soil characteristics and their relationship to soil pollution. |
| 4.4 | Examine the relationship of soils and home site suitability. |

Evidence Standard is Met:

The student will:

- Determine the need for soil and water conservation measures in Tennessee.
- Summarize the soil management practices and their impact on soil erosion.
- Categorize soil characteristics and their impact on soil pollution.
- Determine how soil characteristics affect home site suitability.

Integration/Linkages

Chemistry, Ecology, Geography, Mathematics, Language Arts, National FFA CDE Guidelines for Soil Judging, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- Determine needed soil management practices using the Tennessee Soil Judging Card.
- Determine home site suitability of a plot of land using the Tennessee Soil Judging Card.

## Standard 5.0

**The student will analyze the chemical elements essential to plant growth and the importance and benefits of fertilizers.**

Learning Expectations:

The student will:

| | | |
|---|---|---|
| 5.1 | Evaluate the need for essential elements in plant growth. | ½ |
| 5.2 | Classify essential elements according to their sources. | ½ |
| 5.3 | Evaluate the nutritional needs of soil to promote plant growth. | |
| 5.4 | Calculate the actual amount of nutrients found in bag analysis. | ½ |

Evidence Standard is Met:

The student will:

- Compare the effects that essential elements have on plant growth.
- Interpret the results of a soil test.
- Calculate fertilizer needs based on a soil test.
- Using a bag analysis, calculate the amount of nutrients found in the fertilizer.

Integration/Linkages

Biology, Chemistry, Mathematics, Language Arts, National FFA CDE Guidelines for Soil Judging, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- Take a soil test and obtain results.
- Obtain fertilizer bags and containers and calculate nutrients found in the mixture.
- Categorize nitrogen, phosphorus and potassium by physical characteristics.

## Standard 6.0

**The student will evaluate the nutrient requirements of plants and nutrient deficiencies in plants.**

Learning Expectation:

The student will:

| | | |
|---|---|---|
| 6.1 | Differentiate between primary, secondary and micronutrients. | ½ |
| 6.2 | Measure soil pH and its effects on nutrient availability. | ½ |
| 6.3 | Assess the nutrient deficiency symptoms in plants. | |

Evidence Standard is Met:

The student will:

- Detect nutrient deficiencies of plants using physical characteristics.
- Differentiate the nutrient requirements of legume and non-legume crops.
- Propose the need for primary, secondary and micronutrients in the soil.
- Determine the impact of pH on the availability of different elements needed by plants.

Integration/Linkages

Biology, Chemistry, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- Recommend remedies for plants with nutrient deficiencies.
- Calculate lime needs of a soil to change pH to desired levels.

## Standard 7.0

**The student will evaluate the types of pollution in the environment and methods of controlling pollution.**

Learning Expectations:

The student will:

7.1 Evaluate sources of water pollution and methods of control.
7.2 Examine sources of air pollution and methods of control.
7.3 Examine sources of noise pollution and methods of control.
7.4 Analyze procedures for handling, storing and disposing of hazardous materials to protect the environment.
7.5 Examine the role of recycling and composting in controlling pollution.

Evidence Standard is Met:
The student will:
- Compare sources of water, air and noise pollution.
- Recommend procedures for controlling water, air and noise pollution.
- Specify procedures to handle, store and dispose of hazardous materials.

Integration/Linkages
Physics, Chemistry, Biology, Ecology, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills) OSHA Standards, TOSHA Standards, EPA Regulations.

Sample Performance Tasks
- Obtain restricted use pesticide certification.
- Build a compost structure.
- Interview a health department employee for local standards on pollution.

## Standard 8.0
**The student will analyze factors used for selecting a site that ensures the optimum growth and economic return of agricultural crops.**

Learning Expectations:
The student will:
8.1 Evaluate factors that affect site selection for agricultural crops. ½
8.2 Recommend best management practices that will ensure appropriate use of a land resource. ½

Evidence Standard is Met:
The student will:
- Specify factors that affect site selection for agricultural crops.
- Determine how physical characteristics of soil affect crop selection.

Integration/Linkages
Geography, Geology, Physical Science, Biology, Chemistry, Language Arts, National FFA CDE Guidelines for Soil Judging, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks
- Utilize the Tennessee Soil Judging Card to identify crop selection and capability classes.
- List physical conditions of soil required by the major agricultural crops.

## Standard 9.0
**The student will integrate academic competencies in the area of soil and landscape management.**

Language Arts:
The student will:
9.1 Synthesize research data in an original oral or written work on soil management.
9.2 Use computer word processors to save and print reports on soil management.
9.3 Browse, select, and record information from Internet sources on pollution.

Mathematics:
The student will:
9.4 Calculate fertilizer application rates for 100 sq. ft., 1000 sq. ft., and acre areas.
9.5 Calculate horsepower ratings required for certain tillage implements.
9.6 Calibrate sprayers for volumes to be applied per acre designated.

Science:
The student will:

9.10 Specify soil components and their functions.
9.11 Evaluate soil types by use of morphology.
9.12 Assess the importance of internal drainage for crop growth and pollution control.
9.13 Compare advantages and disadvantages of tillage systems.

Evidence Standard is Met:
The student will:
- Determine methods for managing soil and other natural resources.
- Prepare a rationale for consideration of new up-to-date techniques and seed varieties available.
- Determine the use and depletion of natural resources on the US and other countries.

Integration/Linkages
Mathematics, Biology, Chemistry, Ecology, Social Studies, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks:
- Research the impact of new technology to improve yields of agricultural products produced in the US.
- Study technical information to determine horsepower requirements.
- Safely operate machinery and equipment in land preparation.
- Calibrate sprayers using metric and standard volumes.
- Present a land use management plan to conserve soil and other natural resources.

## Standard 10.0

**The student will develop premier leadership and personal growth needed for careers in the area of crop production.**

Learning Expectations:
The student will:

10.1 Evaluate positive work attitudes and ethics used in natural resource management. ½
10.2 Prepare career plans that reflect critical thinking skills to encourage life-long learning. ½
10.3 Compare human relation a skills used in dealing with landowners. ½
10.4 Prepare career goals, based on a related SAEP, supervised agricultural experience program in natural resource management. ½

Evidence Standard is Met:
The student will:
- Determine ways one can demonstrate positive work attitudes and behaviors in a conservation position.
- Prepare three examples of how attitudes can affect one's ability to succeed in traditional agricultural production when changes occur in the industry.
- Propose employment goals that lead to a career in natural resource management.
- Determine how proper planning and organization can affect the outcome of a project.

Integration/Linkages
Social Studies, Language Arts, National FFA Guidelines for Prepared Public Speaking, National FFA Guidelines for Extemporaneous Speaking, National FFA Code of Ethics, National FFA Guidelines for Proficiency Awards and Degrees, SCANS (Secretary's Commission on Achieving Necessary Skills), National FFA Guidelines for Community Education Programs

Sample Performance Tasks:
- Hold a class discussion on attitudes and behaviors common to the workplace.
- Role-play a situation where you are an employee communicating with your supervisor about changes that are occurring.
- Write a six-to-eight-minute speech about the importance of environmental conservation to the American people.
- Chart an outline of your employment goals for 5 years in a traditional agricultural career.
- Prepare a four-to-six-minute extemporaneous speech on new technologies in soil conservation and land management.
- Complete a FFA Proficiency Award and Advanced Degree based on a natural resources SAEP.
- Participate in FFA PALS program.

- Participate in Food for America Program.
- Participate in FFA Partners for a Safer Community.
- Participate in Farm Safety Just 4 Kids.
- Participate in America Reads Challenge.